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AMPUTATION AT THE HIP-JOINT.

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WITH TWO WOOD-CUTS.

To determine the conditions which render amputation at the hip-joint necessary, and the propriety of its performance under any circumstances, are among the most difficult problems in military surgery. The proper treatment to be adopted in a case of gunshot fracture of the trochanters and neck of the femur is a grave question, especially if there be serious secondary lesions of the great vessels complicating it. The difficulty of its solution is little lessened by a consultation of authorities; some whose opinions are of the greatest weight standing arrayed on each side of the question; some regarding it only justifiable as a secondary operation, after a tolerance of suffering and suppuration has been established; others advocating recourse to it after reaction from the original injury has been established and before the vital forces have been exhausted by a uselessly prolonged period of pain, confinement, and suppuration; others again proposing to operate primarily, believing that the use of chloroform obviates the shock to such a degree as to render it safe, and not subjecting the patient twice to the shock of a grave injury; while many condemn it under all circumstances, trusting, in cases not suitable for resection, to the judiciously aided efforts of nature for a more favourable result than is predicted by the published statistics of the operation with their appalling list of deaths.

The wonderful results obtained from carbolic acid and other antiseptics in the conservative field of surgery of late years will do much to strengthen this latter opinion, or at least to circumscribe the list of cases demanding this terrible mutilation of the human body.

I was most forcibly impressed with these reflections after reading the two admirable papers on this and its associate operation, issued from the Surgeon-General's Office U. S. Army; viz., Circular, No. 7, of July 1st, 1867, on Amputation at the Hip-joint, and Circular, No. 2, of January 2d, 1869, on Excision of the Head of the Femur, which are among the

most valuable contributions on this subject to surgical science that have ever been presented to the profession.

The opinions expressed in these reports are those of the leading surgeons of the U. S. Army in the late war, by whom the operation and the various substitutes for it were put into practice as extensively and under as fair conditions for determining their relative value, as by any other body of men in the history of surgery. As such, their opinions are entitled to the highest consideration; but to what widely different conclusions these distinguished gentlemen have arrived, and how little they have settled these questions, can only be appreciated by a perusal of their letters as published in the works referred to.

We are all aware of the fallacy of surgical statistics; but such is the practical spirit of the age that the world and the profession demand facts, not theories, and none will deny that by an intelligent analysis of a large number of cases practical deductions of great value may be arrived at. It is with the view of adding to the reliable statistics of this debatable operation that I present the following account of a case which has recently occurred in my military practice in the late revolution in this country, leaving theoretical discussions of it to men of abler minds and greater leisure than I possess:—

Juan Blanco, æt. 14 years, a native of Guadalajara, Mexico, serving as orderly to Lieut. Ribera of the 21st Infantry of the Line, Mexican Army, was wounded by a conical musket-ball at the storming of the city of Saltillo, Mexico, on the morning of the 5th of December, 1871. He was carried the same day to the field hospital of the insurgent army, where he lay upon the ground with little or no attendance for several days. He was then removed to the military hospital of this city, where I first saw him on December 13th, he being pointed out to me by the surgeon in attendance as a hopeless case. On the night previous he had suffered a severe secondary hemorrhage, in which the blood ran off the bed and along the floor a distance of several yards, in consequence of which he was greatly debilitated and had fainted several times.

Determined to make an attempt to save his life, I asked and obtained permission to remove him to my house, which was done the same day. Upon inquiry I learned that he had had no evacuation from the bowels for eight days, or since the reception of the wound, during which time he had eaten very little food. An enema was given, which operated well, and he was allowed to rest the next day, being fed with nourishing broths, no attempt being made to change the dressing of the wound for fear of further hemorrhage.

On the morning of December 15th a consultation was held, at which Drs. Smith, Luckie, Barreda, and Fernandez were present. We found a gunshot wound in the upper portion of the left thigh, which was stuffed with lint, saturated with liquor ferri perchloridi, firmly bound down by a compress and roller. Upon removing the lint the wound was observed to be in a sloughy condition and quite offensive. From the account of the ward surgeon, and the appearance of the wound, it was thought that the hemorrhage had arisen from the profunda femoris artery, and this opinion was subsequently verified.

A most extensive fracture of the trochanters and upper half of the left femur was discovered, the ball having entered the thigh at the middle of the inner margin of Scarpa's space behind the femoral artery, after having first nearly divided the penis; crushing the bone to fragments in its course, and making its exit just below the trochanter major. (See accompanying representation of the bone.)

In view of the great extent of the injury to the bone, and of the secondary hemorrhage from so important an artery as the profunda femoris with the almost certainty of its recurrence, and the difficulty of the deligation of the vessel, it was decided to amputate through the trochanter or neck of the femur as the only reasonable chance of saving life, and I performed the operation by inserting a long knife through the track of the wound, and cutting outward, making a short anterior, or rather antero-exterior flap; reinserting the knife, and making a long and thick postero-interior one, being guided in my selection of the incision and flaps by the peculiarities of the wound, making them from the tissue least injured by spicula of bone, and inflammatory and suppurative action.

Upon examining the remaining fragment of bone, I found that the capsular ligament was detached from its adhesions along the upper margin of the posterior inter-trochanteric ridge, which had been almost entirely carried away by the ball, along with the lesser trochanter; and that the neck of the bone was becoming carious, being involved in the same diseased action which had divided the artery, and was manifest at the wound of entrance.

Convinced now that the diseased action extended to within the joint, and of the worse than uselessness of leaving the head *in situ* to become a source of future irritation, I at once disarticulated and removed it, cutting away the capsular ligament close up to the acetabulum. Finding this latter in a healthy condition, I terminated the operation by slightly trimming the flaps to suit the altered operation, being careful to remove every fragment of tissue showing the least sign of disease. The wound was then carefully washed with a solution of chloralum, one ounce to four ounces of water, and, as soon as all bleeding had ceased, it was closed with silver-wire sutures, leaving drainage outlets at upper and lower angles, and dressed with lint wet in the same solution.

I was ably assisted in the operation by the gentlemen above named, and Messrs. Quintanilla, Elizondo, Cortesan, and Lozano, medical students from the school in Monterey. Chloroform was administered to complete anæsthesia by Dr. Smith, and was well borne.

Thanks to the efficient aid of my assistants, less blood was lost than in an ordinary thigh operation. No torniquet was used, nor was compression of the abdominal aorta attempted, Dr. Barreda compressing the femoral artery at the crural arch with the thumb of one hand, while with the fingers of the other he followed the knife as I made the anterior incision, grasping the artery as it was divided and retracting the flaps over the groin; another assistant standing ready to do the same with the branches of the ischiatic, circumflex and gluteal, which were ligated on the moment, the femoral being tied last.

When it is considered that the patient was a slim delicate boy, worn down by suffering, suppuration, and the neglect consequent upon the

defeat of the troops to which he belonged, the occupation of the city by the hostile forces, and the lack of efficient hospital organization common to insurrectionary armies; it is not surprising that the shock of the operation was great. His pulse, which had been about 130 before the operation, disappeared entirely at the wrist for from twelve to sixteen hours; cold clammy sweat stood in bead-like drops on the skin, the breathing became sighing and hollow, and it was only by the use of the most vigorous measures that he was roused from this state of collapse. One ounce of brandy was ordered every two hours, or rather "ad libitum" with two grains of musk and eight grains of carbonate of ammonia every two hours, and artificial heat applied to the extremities, under which treatment a slow but steady reaction was established by the morning of Dec. 16. 6 A.M. Pulse feeble, 160; tongue dry; great thirst, anxiety, restlessness, but no delirium. Gave an eggnog and ordered Leibig's extract of beef ad libitum; continued brandy, one ounce every three hours. Nothing of note occurred during the day, the reaction steadily improving, the pulse gaining in volume and diminishing in frequency. 9 P. M. Pulse 140, much fuller; tongue more moist; less thirst; less pain; wound cool, and appears to be glued together by adhesive inflammation. Some sanguineous discharge from angles of wound; continue treatment.

17*th*, 9 A.M. Pulse varying from 135 to 145; temperature in axilla 100.5; appetite good; general condition improving. 9 P.M. Has eaten well and passed a very good day, but in the evening the young vagabond induced the servant to give him more than his allowance of brandy, and he is gloriously drunk.

18*th*, 9 A.M. Pulse 150; temperature 102; is clearly no better from last night's indiscretion; wound however cool; looks well and appears to be adherent; ordered boiled chicken, extract of beef, eggnog, and brandy in greater moderation than yesterday. 9 P.M. Has passed a very comfortable day; ate half a boiled chicken at dinner with appetite. General condition much the same, but pulse rather weaker than in the morning. Wound discharging well; pus at both outlets. Has had a natural action of bowels spontaneously. Smokes cigarettes with great satisfaction.

19*th*, A.M. Pulse 150; temperature 101.5; good appetite; condition improving. Removed all of the sutures, and found union by first intention complete throughout the wound except at the angles, where bits of lint had been inserted to maintain outlets for sanguineous exudations, and the synovia, which I anticipated would be secreted from the acetabulum upon its being opened, but of which no appearance has existed in the discharges which now consist of laudable pus. Supported the wound with strips of adhesive plaster. Injected orifices at angles of wound with the solution of chloralum twice a day; continue treatment. 9 P.M. Has eaten during the day a large piece of beef-steak, part of a chicken, bread, rice, extract of beef, etc. Pulse 138.

20*th*, 9 P.M. Has passed a good day, and is becoming very ill natured. Pulse 138.

21*st*, 9 A.M. Pulse 145; temperature 102.2; is slightly feverish, due to having no action of the bowels for several days. Ordered a simple anema, which did not act. Gave an ounce of castor oil, to be followed by another enema. 9 P.M. Has had a good action of purge, and is better. Pulse 140.

22*d*, 9 A.M. Pulse 132; temperature 101.2; condition decidedly improved. Stopped brandy, and ordered two pints of ale daily, instead.

23*d*, 9 A.M. Pulse 150; temperature 101.5. The wound does not look

so well to-day, the granulations being somewhat pale and the pus scanty though well formed. The cicatrix opened for about an inch and a half at its outer end when I removed the adhesive strips. Upon investigation it was found that he has deceived me as to his food, taking much less than I supposed. Made no change except to personally superintend his meals.

24*th*, 9 A.M. Pulse 138; temperature 101.5; the granulations in the wound a little more florid. Changed the chloralum dressing for ℞ acid carbolic ℥j, Ol. olivæ ℥j. Commenced giving elixr Calisayæ, one ounce three times daily. The bowels act once in two days, the evacuations being consistent and show good digestion. The patient sat up in bed to-day, and amused himself by drawing pictures on a slate.

25*th*. Pulse 138; temperature 102. Removed all the ligatures but two. Wound rather pale, dressed with carbolic acid ℥j, resin cerate ℥j.

26*th*. No change. Pulse 136; temperature 101.8; continue treatment.

27*th*. Pulse and temperature same as yesterday. Had considerable griping in the bowels. Gave tr. zingiberis and tr. opii camph. Appetite not so good as heretofore, but appearance of wound improved. Another ligature came away.

28*th*. Pulse 134; temperature 101. The last ligature, that of the femoral artery, came away to-day. General condition improving, and granulations in wound becoming again florid and firm; appetite better; no griping; bowels act once in twenty-four hours.

29*th*. Pulse 126; temperature 100.8; steadily improving; wound rapidly filling up. The patient sat up in a chair to-day for first time.

The boy continued improving, sitting up a few hours daily, and rapidly gaining strength until January 15th, one month from the date of operation, when he, for the first time, left his bed on crutches, with the aid of which he soon learned to walk.

The wound was firmly closed, except at the two angles, where a slight discharge was kept up for another month or so by a few small spicula of bone which had been buried among the tissues, escaping notice at the time of operating, and which made their way to the surface from time to time, and were extracted or discharged with the pus.

On February 3d he walked from my house to the hospital, a distance of four squares, all the way up hill, without assistance, where he remained until July 20, 1872, when a photograph (represented in the accompanying cut) was taken, and on the day following he left for the city of Mexico with the cavalry brigade of Gen. Ribera, in perfect health and with his stump entirely healed, seven months and six days after the operation.

During the time of his stay in the hospital nothing noteworthy occurred, except that in April he had an eruption of a herpetic character at the margin of the

cicatrix, the outer end of which, in consequence, opened for about an inch and a half, rendering it necessary to support it with adhesive straps, under which treatment, combined with an improvement in diet and ventilation, and frequent baths in cold water, it soon firmly closed, and contracted to a surprisingly small line.

At the risk of wearying the patience of my readers I have reported this case in detail from the notes in my case book, and I only regret that I did not get the temperature of the first and second days, owing to not having my axillary thermometer at hand.

I wish to direct attention to several points of treatment, and certain surrounding circumstances, which seem to me to have contributed to the favorable result, and explain the remarkable rapidity of recovery, this boy being the first out of eight amputations of knee-joint and thigh, which I made at that time, who sat up on a chair or walked with crutches.

The operation in itself was that calculated to cause the least loss of blood from the facility and rapidity of its performance, no attempt being made to control hemorrhage by mechanical appliances, always more or less imperfect, but dependence being placed upon the dexterity of the assistants in following the knife with their hands, grasping the flap as it was made, and stopping the orifices of the bleeding arteries with the tips of their fingers as soon as they were discovered.

The liberal use of stimulants and nutrients on a scale and in view of symptoms, that would scarcely meet the approval of those unaccustomed to hazardous operations upon soldiers worn down by physical and moral causes, needs only to be referred to to receive its just share of credit in the result.

The use of chloralum as a dressing, which in my hands has been of great service, and I think its use contributed largely to the success of this case, securing union by first intention, preventing diffuse suppuration, and destroying all septic influences. My experience has not yet been sufficiently great in its use to warrant my drawing a comparison between it and carbolic acid, but, so far as it goes, in hospital gangrene, erysipelas, and simple phagedena, it leans decidedly in favour of the chloralum.

The extraordinary rapidity of recovery and the absence of all untoward symptoms in the progress of the case are attributable to the causes referred to, combined with the youth of the patient, the climate of the place in which the operation was performed, and the race to which the patient belonged. The lower order of Mexicans, in whom the Indian blood predominates, or is almost pure, bear surgical operations better than any other people I have seen; due, perhaps, to their simple and temperate life, mainly in the open air; their stoicism and complete resignation to the "voluntad de Dios," securing a tranquil state of mind. This place being over 5000 feet above the sea level, situated in a mountainous district noted for its salubrity, the climate is singularly favourable to surgical operations.

As to the operation selected I desire to call attention to certain advantages derived from it, premising that I claim no credit for originality in it, as I was almost compelled by the peculiarities of the wound to adopt it as the best means of securing sound flaps. From the oblique character of the wound its outer angle is sufficiently low when the patient is on his back to admit of complete drainage of discharges from the deepest part of the wound, the acetabulum, while, at the same time, it is sufficiently in front to facilitate the dressing, leaving the cicatrix subsequently under the patient's own control for washing, dressing, etc.

The stump obtained by making the long flaps from the posterior and inner part of the thigh presents great advantages as affording a full round buttock to the patient, on which he can sit with ease and comfort undisturbed by the cicatrix, which is entirely out of the way; as will be seen by the photograph; and in the event of the adaptation of an artificial limb it is sufficiently high to be out of the line of pressure of the weight of the body, at the same time being in the softest part of the stump; and not exposed to pressure over any bone.

Although not prepared to go into a disquisition upon, or defence of, this operation, yet I will say that I can conceive of no other procedure which would offer a chance of life equal to it in a case like the one I have just reported; in which the bone was extensively fractured to within the capsular ligament; or at least to its very insertion, the neck of the bone carious to the epiphysis from an extension of the sloughing action in the soft parts, the joint unquestionably opened; *and where a secondary hemorrhage from so important a vessel as the profunda femoris had been caused by sloughing of the wound.*

The deligation of the profunda is in itself a serious and difficult operation, requiring a high order of operative skill, and in this case would have probably been useless, as will be admitted by all who have seen such cases die after repeated hemorrhages, from the diseased action involving the coats of the artery above the ligature.

The ligature of the femoral artery at the crural arch, the nearest point of safety to the slough, would, in all probability, condemn the limb to gangrene. The excision of the head and nearly half of the shaft of the femur, is almost as formidable an operation as the amputation even, under favourable circumstances, and would have been useless in this case, as offering no relief to the principal danger, that of a return of the hemorrhage.

To expectation the same argument applies, so what can the surgeon do but amputate? That by so doing he will offer the unfortunate patient a fair chance of life is shown by this case.

If any conclusions can be founded on the foregoing report and observations, they are, that where gunshot fracture of the trochanters, neck or head of the femur is complicated by wound of the great vessels of the

thigh, or where they are included in a slough of the wound causing secondary hemorrhage; it is the duty of the surgeon to give the patient the chance for life that lies in *amputation at the hip-joint.*

SALTILLO, MEXICO, August 6, 1872.